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Some Surgical Operations on the Ox.

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The conditions with which I propose to deal are those which need special consideration on account of the differences in the anatomy of the region affected from the anatomy of the same regions in the horse, with which we are probably more familiar. We all realise that the present trend of affairs is constantly leading the veterinarian toward greater practice on conditions affecting the food-producing animals, and it is extremely important that the special problems affecting each species be emphasised.

DRAINAGE OF THE FRONTAL SINUS.

The frontal sinus of the ox is very different from that of the horse, particularly with respect to its extent superiorly and the fact that it is partially divided by many bony septa, which makes direct drainage through the cavity impossible. Aside from the usual description of the frontal sinus as given in Sisson's Anatomy, I wish to call attention to the following facts:—

1. The frontal sinus in many specimens extends posterior to the region of the poll or frontal eminence and laterally to a point just anterior to the external ear.

2. The deepest and freest portion of the frontal sinus is found about midway between the base of the horn core and the median line. The cranial plate arches upward in the centre of the skull inferior to this free portion, so that the cavity is limited to the lateral borders on a line drawn across the narrowest portion of the head, about midway between the posterior border of the orbital cavity and the base of the horn. In the plane which passes through the posterior borders of the orbital cavity the sinus again swings toward the median plane, and at this point constitutes the second largest cavity and marks the lower limit of the frontal portion of the sinus. Upon a plane passed through the middle of the orbital cavities, the frontal portion of the sinus is usually separated from the turbinal portion of the sinus by a complete septum.

The same idea may be expressed in a different and perhaps clearer way by stating that if a horseshoe having wide webbed branches and a narrow toe should be placed upon the ox's head so that the upper branch would rest upon the median line in the region of the poll and the toe of the shoe would rest upon the lateral portion of the frontal region at its narrowest point, the lower branch would rest over the second most free portion of the sinus and any point covered by the shoe would be a safe point for trephining the sinus.

3. On a plane passing through the narrowest portion of the region a small opening about the size of a lead pencil passes from the floor of the sinus into a compartment which is separated from the temporal fossa only by a thin plate of bone. In case pus is retained in this compartment, the bone sometimes becomes necrotic and an abscess develops, posterior to the eye and occupying the temporal fossa.

4. From the lower limit of the frontal portion of the sinus on a plane passing through the centre of the orbits and about one and one-half inches from the median line, the frontal sinus communicates with the nasal cavity through the ethmoid cells. From a trephine opening located as just described, drainage may be established through the nose by passing a curved instrument from above to below and directed slightly toward the median line.

The frontal sinus of the ox usually becomes infected following accident to the horn or dehorning operations. In these cases one usually has a means of entrance to the superior free portion of the sinus. The other two points where it is most practicable to trephine the sinus for further drainage are over the toe and the lower branch of the horseshoe-shaped area already described. From the first of these the compartments in the temporal fossa may be flushed, and from the second one bottom drainage may be established through the nasal cavity. If an abscess forms in the temporal fossa, it may be drained by an incision through the skin at the most prominent point. Such drainage is not complete and usually constitutes a temporary relief until animals can be marketed.

EXCISION OF THE EYE.

The frequency of the occurrence of accidental wounds, abscesses and malignant tumours of the eye of the ox often makes it necessary or desirable to remove the entire structure. We believe that the most satisfactory method of performing this operation involves the complete removal of the conjunctiva so as to prevent the formation of secretions which result in constant discharge.

To perform the operation, confine the animal on the table or ground, and carefully remove, by shaving, the hair of the lids and surrounding area and paint the surface with tincture of iodine. With a small hypodermic needle inject subcutaneously a liberal amount of local anæsthetic, such as 1 per cent. solution of stovaine, apothesine or procaine, containing adrenalin chloride in a 1-to-5,000 solution, into the upper

and lower lids, about 1 cm. from the border of the lids. Follow this by injecting about 1 c.c. of the same solution at four different points into the depths of the region posterior to the orbit.

Suture the upper and lower lids together with a continuous silk suture, confine the skin of the lids with tissue forceps, and with a very sharp knife make an incision through each lid about a quarter of an inch from their borders, uniting the incisions the same distance beyond the lateral and medial canthi. The incision should pass to but not through the conjunctiva. The hemorrhage should at all times be carefully controlled so that this technique may be carried out after completing the incisions to a uniform depth throughout their extent. The conjunctiva is separated from the lids back to its attachment to the orbit. This leaves the conjunctiva attached to the border of the lids, which have been sutured together, and these tissues may then be used to apply attraction upon the orbit. After the dissection has been carried back to the point of insertion of the conjunctiva to the orbit, the muscles of the eye are clipped with a pair of curved scissors and finally the optic nerve is cut in the same manner and the orbit completely removed, the third eyelid being removed with it. All of the periorbital fat should be left in place. The hemorrhage, which is not great, should be controlled with sterile gauze sponges and all blood clots removed from the cavity. The cavity is then packed with sterile gauze dusted with equal parts of chlorinated lime and boric acid well mixed together, or iodoform, and the cut edges of the lids are carefully sutured with interrupted silk sutures beginning at the external angle, omitting the last stitch to provide drainage. Remove the pack in twenty-four hours, and inject into the cavity about one-half ounce of Bipp, which is a paste composed of iodoform 16 ounces, bismuth subnitrate 8 ounces, liquid paraffin 8 ounces.

Very little after-treatment will be found necessary. The cavity will fill and the edges of the lids become permanently healed together in about two weeks. The area is finally left somewhat sunken, but the surface is absolutely smooth, and no discharging wound remains.

Actinomycosis in the Mandibular and Parotid Regions.

Actinomycosis affecting the glands of this region is quite common in cattle and often calls for some form of surgical procedure. There are two methods of dealing with this condition. The one involves complete removal of the diseased tissue, and is indicated in case of circumscribed tumours in valuable animals which are to be kept for a considerable period of time. The second involves drainage and proper after-treatment, and is indicated in case of butcher animals which are being fed for market. Here it is of advantage to use a method which will control the condition and at the same time incur the least possible loss of time and flesh.

Without enumerating the many problems connected with complete removal of such tumours, due to the large number of important structures in this region, I wish to emphasise a few important points in connection with the technique of the operation.

1. After thoroughly preparing the region and locating as far as possible structures to be avoided, a liberal elliptical incision should be made in a longitudinal direction, which should include any and all fistulous openings and should be large enough to remove all excess of skin due to the enlargement. The incision should be carefully carried to the line of cleavage between the normal and diseased tissue. This line can be discovered most easily by beginning the blunt dissection as near the base of the tumour as possible at some point from which it will be more easy to work out in all directions than to attempt to find the line of cleavage over the periphery of the tumour.

Following the line of cleavage with blunt dissection, using the scalpel handle or Mayo scissors so far as possible, it should be possible to recognise any important vessels, ducts or nerves before they are sectioned. Vessels which must be cut should be ligated before being cut. Large vessels should be ligated at two points and then divided between these two points. The separation should continue until the tumour has been completely isolated. It is usually found that a small neck of diseased tissue extends into the depths of the region beyond the large portion of the tumour. This should not be cut across, but completely removed.

If the wound area is large and important vessels are exposed, the tissue spaces should be closed and protected by suturing the tissues together in the depths of the wound. If there is a parenchymatous hemorrhage, a sterile gauze pack should be placed in the cavity and the skin united with interrupted sutures. It is important to warn the owner against the danger of post-operative hemorrhage, and to prevent this the animal should be closely confined in a stall where there is no opportunity for the animal to place pressure on the jugular region. A course of potassium iodide treatment may be given as a further safeguard against recurrence.

2. The second method has been found to be very practical and satisfactory in case of animals in the feed lot. It consists in thorough drainage of the process, followed by painting the cavity with tincture of iodine and then packing the cavity with gauze upon which has been smeared about half an ounce of paste made of equal parts of zinc chloride and sanguinaria. This pack should be sutured in place and allowed to remain for five to eight days, after which it is removed, together with the slough, which has been caused by the pack. If practicable, it is well to carry out the potassium iodide treatment in these cases as well. Under such treatment we have found that the tumours make either complete recovery or sufficient reduction takes place so that the animal can be marketed without loss, as there is very little if any loss of flesh due to the operation if an animal can be handled in the stocks or chute. For these reasons we believe this method to be practical, although not so satisfactory from a surgical standpoint.

Rumenotomy.

I will not attempt to describe the indications for rumenotomy, but wish rather to direct attention to some of the important points in performing the operation. Many times the animal is in such a toxic condition that anæsthesia is not necessary and the problem of control does not enter into consideration. If this is not the case, satisfactory anæsthesia can be obtained by the use of local anæsthetics injected subcutaneously along the line of incision. The animal may be controlled either in a standing or recumbent position, according to the circumstances.

After shaving the region of the left flank, the area should be carefully sponged out with bichloride of mercury, 1 to 1,000, and painted with tincture of iodine. The structures to be divided, named in order from without to within, are as follows :—

1. Skin.
2. Subcutem and subcutaneous fat in variable amounts.
3. The external oblique muscle. The fibres of this muscle pass the region in very nearly a horizontal direction and are relatively thin.
4. Internal oblique muscle, and those arising from the ilium, whose fibres are considerably thicker and pass in a direction downward and forward, from the external angle of the ilium. A definite branch of the circumflex artery passes along the superior border of this portion of the muscle.
5. Transverse muscle of the abdomen, which in this region is entirely aponeurotic. The fibres extend in a perpendicular direction, and are white and glistening in appearance and very thin.
6. The iliac fascia. This structure is thin and yellowish in appearance, and is separated from the previously mentioned structure by areolar tissue.
7. The subperitoneal fat.
8. Peritoneum.

The importance of knowing the various structures which are found in this region is that the operator may be able to recognise each structure by its colour and direction of fibres and consequently may know at each step in the operation just how far the operation has progressed.

A perpendicular incision about 8 to 10 inches in length, starting at a point about equal distance from the last rib, the lumbar vertebræ and the external angle of the ilium, should be made through the skin, subcutem and external oblique muscle. The fibres of the internal oblique should be separated in their long direction, across the centre of the wound, and likewise the fibres of the aponeurosis of the transverse muscle and the iliac fascia should be divided in the same direction as a skin incision. After separating the fat, the peritoneum should be picked up with forceps, incised with scissors or scalpel, and completely divided with a blunt bistoury.

The divided edges of the peritoneum should be secured with forceps, which are allowed to remain in place during the operation. A liberal strip of sterile gauze should be placed within the peritoneal cavity, through the lower commissure of the wound, and finally the rumen divided liberally and the divided edges fixed with forceps or tape. Under this method a free opening is made through the abdominal wall and into the rumen, and much less tissue is actually destroyed than by trying to operate by separating all of the muscles in the direction of their fibres.

After emptying at least two-thirds of the contents of the rumen, the edges of the wound in the rumen should be carefully cleansed and the wounds united by using one row of interrupted or continuous silk sutures to adapt the edges.

This line of suture should then be buried for a distance of one-half to three-fourths of an inch by the use of a catgut Lembert suture, No. 2 or No. 3, passed in with a round-pointed needle, attempting to avoid passing the needle through the mucous membrane. Particular care should be taken to get equal apposition of the peritoneal surfaces, and especially so at the commissures. Within twelve hours following the operation a line of sutures so placed will be completely covered by a wound exudate and adhesion will begin to form.

After removing the gauze and preparing the wound edges, the peritoneum, still fixed in the forceps, should be pulled up and sutured with catgut. A few catgut sutures may be used to unite the muscle wounds or to obliterate spaces within the tissues, and finally the skin should be sutured with silk, leaving drainage in the lower angle of the wound and the line of suture protected with gauze and collodion except at the drainage opening.

The points which I wish to emphasise particularly are the importance of the careful apposition of peritoneal surfaces, both visceral and parietal. I am thoroughly convinced that no abdominal wound is properly cared for which does not include these two precautions.

The complications may be peritonitis, abscesses in the wall of the abdomen, and fistula of the rumen. Peritonitis should be treated on general principles and abscesses treated by careful and complete drainage. By using catgut sutures in the depth of the wound, I believe the number of abscesses can be reduced. If fistula results, the process should be allowed to heal as completely as it will, and if complete healing does not take place, the final tract should be curetted and cauterised with a hot iron or pure phenol, after which healing usually takes place.—*Journal American Veterinary Association*, October, 1921.

Air Carriage of Pathogenic and other Organisms.*

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In all laboratories engaged in the preparation of serum the latter occasionally becomes contaminated by micro-organisms. It is often a matter of considerable difficulty to determine the origin of such organisms, and investigations upon the source of

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these contaminations not infrequently prove of considerable interest. This paper records some preliminary experiments which were designed to throw light on the subject.

The first experiments were made at a stable containing 20 horses, arranged in two equal rows separated by a wide central passage running from north to south and opening at each end of the building.

Agar plates were exposed for a period of 30 minutes as follows: six inside the stable, six arranged in pairs, 30 feet from the open stable doors, the centre pair being opposite to the entrance with a space of 20 feet on either side between this pair and the lateral pairs.

Similar sets of six were placed at 90 feet and at 150 feet from the stable doors, and control plates were placed in an open space 400 feet from any building.

The exposures were made on three dry summer days under the following meteorological conditions:

Day	Velocity of wind.	Wet bulb	Dry bulb
1	normal	58°F.	60°F.
2	moderate	56°F.	58°F.
3	strong breeze	58°F.	60°F.

The table below gives the results of the bacteriological examination of the plates after 18 hours' incubation at 37° C. The number of colonies represents the average of the six plates in each position.

The average number of colonies on the agar plates exposed at a distance of 400 feet from any building on various days was found to be six, most of them being staphylococci. Staphylococci, various species of mould and *B. subtilis* are commonly found in the fodder and bedding of the large herbivora, and these organisms were presumably air borne directly from the stables.

In estimating the importance of any suspected source of bacterial contamination, two methods are available, namely the identification of the bacterial population on the plate with that present at the source and the consideration of curves based upon the bacterial count obtained from plates exposed at various points in relation to the source. The point at which the curve begins to "flatten out" may be regarded as the limit of contamination from the particular point, under the conditions of the experiment.

Situation.	No. of colonies.	Organisms found.
Calm day.		
Inside stable	300	Staphylococci, moulds, gram-negative bacillus, *B. subtilis*
30ft. from stable	30	Staphylococci, moulds, gram-negative bacillus
90ft. ,, ,,	12	Staphylococci, moulds
150ft. ,, ,,	3	Staphylococci
Moderately windy.		
Inside stable	800	— —
30ft. from stable	55	— —
90ft. ,, ,,	23	Not ascertained
150ft. ,, ,,	16	,,
Windy day.		
Inside stable	730	Staphylococci, moulds, gram-negative bacillus, *B. subtilis*
30ft. ,, ,,	200	,, ,,
90ft. ,, ,,	90	Staphylococci, moulds, *B. subtilis.*
150ft. ,, ,,	40	Staphylococci, moulds

PATHOGENIC ANAEROBES IN THE AIR OF STABLES, ETC.

Petri dishes containing nutrient broth were exposed in a stable for a period of six hours, on each of six successive days. The six samples after being mixed, were heated at 70° C. for 30 minutes. The heated broth was then inoculated into meat tubes and incubated at 37° C. for 24 hours. Microscopical examination of the resulting cultures revealed an apparently pure growth of a gram-positive, non-motile bacillus of from 5–8 microns in length and about 1–5 microns in breadth. Subsequent cultivation in milk produced the stormy fermentation characteristic of *B. welchii*. A small quantity of the culture was inoculated into three groups of guinea-pigs which had previously been injected with antisera to *B. welchii*, Vibrion Septique and *B. oedematiens* respectively, as well as into normal guinea-pigs. All the inoculated animals died of typical gas gangrene with the exception of those which had previously received an injection of *B. welchii* antiserum. From these experiments it is clear that *B. welchii* was commonly present in the air of the stable.

Six samples of dust from the interior of the roof of a second stable and six samples of material from crevices of the floor were collected in separate sterile vessels, and portions of each were inoculated into meat tubes which were incubated under anaerobic conditions, at 37° C. from 18 to 24 hours. The presence of *B. welchii* in every tube was established by the method already described.

Similarly this organism was proved to be present in the dust obtained in seven different buildings in which small laboratory animals (guinea-pigs and rabbits) were housed.

Since *B. welchii* apparently was constantly present in animal habitations it was decided to ascertain the distance that this organism might be carried, in the infected dust.

The experiment was performed as follows:—

The direction of the prevailing wind was ascertained by means of thistledown, liberated from the top of a pair of steps about 7 feet from the ground.

Petri dishes containing nutrient broth were then placed at six points at distances of 30 feet and 90 feet radiating from the steps and in the direction of the wind current.

Some stable dust was then blown from the top of the steps by means of ordinary hand bellows.

The presence of *B. welchii* was established in each of the plates, except that on the extreme right at 90 feet, by cultural methods and animal experiments. Owing to lack of space the limits of dissemination of contaminated dust could not be ascertained.

SUMMARY.

From the foregoing experiments, it may be assumed:

(1) That given favourable conditions, such as a direct current of air through a building, organisms derived from animals, their fodder or environment, may be disseminated over distances up to 150 feet from the building.

(2) That *B. welchii* is frequently present in the dust and dirt of buildings in which horses and small laboratory animals (guinea-pigs and rabbits) are housed, and

(3) That under suitable conditions, spore-bearing anaerobes such as *B. welchii* may be carried with infected dust from such buildings for a distance of at least 90 feet, and probably considerably further.

Rival Methods of Slaughter.

INSTRUCTIVE DEMONSTRATION AT BIRMINGHAM.

The following is the report of the Birmingham Chief Veterinary Officer on a demonstration given in April last in the Central Meat Market :—

I beg to report that, following the application by the Secretary of the Birmingham Branch of the Royal Society for the Prevention of Cruelty to Animals to give a demonstration of the humane cattle killer at our markets, and the permission granted by this Committee, the following programme was carried out on April 6th, at 2-30 p.m., in the public slaughter hall at the Central Meat Market, Sherlock Street :—

1. The slaughtering of four bullocks by the humane cattle killer as recommended by the R.S.P.C.A.
2. The slaughtering of two bullocks by the method now in ordinary use.
3. The slaughtering of four calves by the humane cattle killer as recommended by the R.S.P.C.A.
4. The slaughtering of two calves by the ordinary method.
5. The slaughtering of four sheep by the humane cattle killer as recommended by the R.S.P.C.A.
6. The slaughtering of two sheep by the ordinary method.
7. The slaughtering of two pigs by the humane cattle killer as recommended by the R.S.P.C.A.
8. The slaughtering of two pigs by the ordinary method.

The ordinary method of slaughter was introduced into the programme, so that it could be demonstrated simultaneously with the method recommended by the R.S.P.C.A. to give those people at the demonstration, and who were not accustomed to our slaughterhouse methods, an opportunity of judging the merits and demerits of each method.

CATTLE.

Of the six bullocks supplied, four were shot by the demonstrator sent by the Royal Society for the Prevention of Cruelty to Animals from London. He used the large humane killer, after which the pithing with cane and bleeding was carried out in the usual way ; and then two bullocks were slaughtered by a slaughterman in the abattoir in the usual manner with the pole-axe, pithed, and bled.

	R.S.P.C.A. Humane killer.				Pole-axe.	
	No. 1 Bullock.	No. 2 Bullock.	No. 3 Bullock.	No. 4 Bullock.	No. 5 Bullock.	No. 6 Bullock.
	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.
Fell, time to	0 3	0 2	0 2	0 2	0 2	0 2
Completion of pithing	0 12	0 20	0 12	0 20	0 15	0 8
Duration of bleeding.....	1 35	2 0	1 30	1 0	1 0	1 17

Average duration of bleeding :—R.S.P.C.A. method, 95 secs. ; pole-axe method, 68 secs.

The blood from the pole-axed animal was of a bright red colour, and that of the animals where the humane killer was used was of a dark red colour.

On post-mortem examination of the six bullocks it was found that of the four animals on which the humane killer had been used all of them had regurgitation of the stomach contents into the fauces and nasal cavities, and on splitting the heads of these four a large blood clot was found on the cranial cavity, and the brain blood-stained.

In the case of the two bullocks which had been pole-axed there was no sign of regurgitation of the stomach contents, and the brain was found to be clean and free from blood.

The carcases of the four animals treated with the humane killer were darker in colour than the two pole-axed animals, this darker colour being due to the carcases not having been so completely "bled." I examined the carcases the following morning at 7-30, and found the two pole-axed carcases were well "set" and cleanly bled, whereas the other four carcases were slightly darker in appearance and were not so cleanly "bled."

SHEEP.

Four sheep were shot by the R.S.P.C.A. demonstrator with Greener's Safeti Pistol. Following the shooting of the animals in the head, they were treated in the ordinary way by having their throats cut open.

Two sheep were then dealt with in the usual manner by having the large blood vessels of the throat severed across and their necks broken :—

	Pistol. No. 1 Sheep.	Pistol. No. 2 Sheep.	Ordinary Method. No. 3 Sheep.
	m. s.	m. s.	m. s.
Duration of bleeding ...	0 40	0 35	0 30
Duration of reflex.....	2 5	2 0	2 9

With the ordinary method the brain is practically instantaneously deprived of blood, and the animal becomes unconscious through anæmia of the brain. With this method there is not, from the meat salesman's point of view, any depreciation to the sheep's head.

On subsequent post-mortem examination it was found that in those animals which had been shot the brain and surrounding tissues were badly bloodstained, and the whole action of the pistol rather spoiled the head from a marketable point of view. On the other hand, it appears that sheep slaughtered by the ordinary method become insensible to pain just as quickly as they do under the method recommended by the R.S.P.C.A.

Following the sheep, three calves were stunned by the demonstrator with the pistol as used on the sheep, and two calves were slaughtered in the ordinary way by direct pithing at the first joint of the neck with the knife :—

	Pistol. No. 1 Calf.	Pistol. No. 2 Calf.	Pistol. No. 3 Calf.	Direct pithing. No.5 Calf.	Direct pithing. No. 6 Calf.
	m. s.	m. s.	m. s.	m. s.	m. s.
Duration of reflex ...	4 15	4 30	3 30	1 15	3 45

The result on the carcases of the calves was the same as in the case of the sheep.

By the ordinary method of pithing by the knife the animal is rendered instantaneously unconscious, and to my mind no more humane method of slaughtering is known.

PIGS.

Two pigs were shot in the head by the demonstrator, the pigs were then placed in position of sticking. Neither of the pigs appeared to be unconscious, and owing to the struggling of the pigs it hindered the slaughterman who had to stick them. Two pigs were then slaughtered in the ordinary manner :—

	Shot. No. 1 Pig.	Shot. No. 2 Pig.	Our Method. No. 3 Pig.	Our Method. No. 4 Pig.
	m. s.	m. s.	m. s.	m.. s.
Duration of reflex ...	1 15	1 50	1 50	1 35

The shooting of the pigs had no effect in the reflex action, and would appear to be not so humane as the ordinary method in daily use in the abattoir. The effects on the carcases of the pigs was very marked on post-mortem examination. The carcases of the shot pigs were very dark in colour as compared with the stuck pigs, and the shot animals were badly bled. On examination the following morning it was seen that the carcases of the shot

pigs did not set so well—they had a comparatively high blood content, and therefore the keeping quality of the meat was very much reduced. As in the case of the sheep, the cranial cavity and contents were bloodstained and spoiled from the trade point of view.

Generally speaking, from the humane point of view, there is little choice between the present methods in use in the abattoirs and in the pistol. For cattle the animals are rendered unconscious by the pole-axe in an effective, efficient, and safe manner.

The present method of slaughtering sheep is very effective, the animal becoming immediately unconscious through the anæmia of the brain, and, in the case of pithing of calves, insensibility is obtained instantaneously.

On the whole the shooting has a detrimental effect on the meat, as the carcases are not so completely bled.

It is, in my opinion, not so desirable to alter our present method in favour of the use of the pistol.

THE LONDON THOROUGHBRED STALLION SHOW FOR 1922.

The Minister of Agriculture and Fisheries gives notice that a Show of Thoroughbred Stallions will be held, in conjunction with the Hunters' Improvement and National Light Horse Breeding Society, at the Royal Agricultural Hall, Islington, on February 28th, March 1st and 2nd, 1922.

A Challenge Cup presented by H.M. the King will be awarded for the Champion Stallion in the Show; and a Gold Medal will be awarded by the Ministry to the owner. Sixty King's Premiums (including twelve Super-Premiums) will also be offered for award by the Ministry.

In addition to the King's Premiums, a very limited number of Ministry's Premiums will be available for award on the recommendation of the County Horse Breeding Committees. These awards will not be made, however, until the routes of the King's Premium Stallions have been arranged.

A DISTINGUISHED SCOTS-CANADIAN.

An interesting function took place at Montreal, on October 13th, when Dr. Duncan M'Eachran, Principal of the Montreal Veterinary College and Emeritus Dean of the Faculty of Comparative Medicine and Veterinary Science, was the guest of a company of graduates of the College and Faculty, who had assembled from various parts of Canada and the United States to honour their distinguished teacher. Dr. M'Eachran, who is a native of Kintyre, is now in the 80th year of his age, and in the 59th year of his professional work. The toast of the guest of the evening was proposed by Professor Veranus Alva Moore, Dean of the New York State Veterinary College at Cornell University. Dr. Moore reviewed the history of the institutions over which Dr. M'Eachran had presided since he opened the Montreal Veterinary College in 1866. There could be no testimonial more acceptable to Dr. M'Eachran than to be assured in this manner that his labours were appreciated, and that his graduates had played a worthy part in the veterinary profession in America. Dr. M'Eachran replied in a reminiscent speech. After speaking of the duties of graduates to their Alma Mater, he concluded by thanking them for this the crowning compliment of his life.

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TRAINING IN MEAT INSPECTION.

Reference has already been made to the Report of the Departmental Committee on Meat Inspection, and to the recognition by that Committee of the claims of the veterinary profession to a share in the important public work of meat inspection. The Committee suggests that:—

> **"In the case of medical officers or of veterinary surgeons having responsibility for meat inspection work, it is desirable that they should have received a course of practical instruction in meat inspection, and we submit the point for the consideration of the bodies responsible for the examination for the diplomas for public health or State medicine."**

It is evident the Committee considers that no medical or veterinary student who obtains a licence to practise his calling is qualified to act as a practical meat inspector; or, in other words, neither the newly-fledged medical or veterinary graduate is capable of safeguarding the health of the public or of being just to the butcher or farmer in the inspection of meat. Those who are daily engaged in the important work of meat inspection will proobably agree with the opinion of the Committee.

There may be some members of our profession who will submit that our final year students do have practical training in meat inspection. To those it may be permitted us to reply that a number of visits to a public slaughter-house, where only gross lesions of disease are observed, does not constitute the practical training referred to by the Committee.

As one example, we would point out that the amount of home-killed meat consumed in Great Britain is only about 50 per cent. of the whole, the other 50 per cent. consisting of imported meat, which arrives either in a frozen or chilled state. The final year student has no training in the examination of this class of food, nor has he any knowledge of the various conditions associated with freezing, chilling, and transport, which often renders such meat partly or wholly unfit for human food; neither has he any knowledge of refrigeration or the various methods of preserving foods.

We would also point out that the examination of final year students in the subject of meat inspection does not appear to be considered of sufficient importance to call for the appointment of

an examiner who has a special knowledge of this work. This is unfair to both student and examiner.

With these facts before us, we must agree with the Committee, and we hope that the Committee of the Royal College of Veterinary Surgeons lately appointed to consider a revision of the syllabus will also come to the same conclusion. It may be interesting to this Committee to know that it is within our knowledge that the medical profession is at present revising its syllabus for the D.P.H., and we understand that one of its new conditions will be that the post-graduate student must have had five months' practical training in meat and food inspection in a Public Health Department.

As the Ministry of Health will be the Controlling Authority in any reforms that are inaugurated, we suggest that our present syllabus, with any proposed alterations, and the syllabus for the Diploma in Veterinary State Medicine of the Royal College of Veterinary Surgeons, be placed before the Minister of Health and Sir George Newman, the Chief Medical Officer, with as little delay as possible.

In addition, full publicity should be given to the syllabus for the D.V.S.M., and, further, we would suggest that it is the duty of the Council to see that members who desire to take up public health work obtain the necessary laboratory and practical training at every one of the Veterinary Colleges. The reason for this suggestion being the letters which have appeared in our columns complaining that members could only get the necessary training by going to Edinburgh. Any member who desires to obtain the D.V.S.M. should receive every encouragement to do so in order that there may be many young men holding the qualifications suggested by the Meat Inspection Committee.

Abstracts and Reviews.

Trypanosomicidal Powers of "Bayer 205."

Though many drugs have been tried in the treatment of trypanosomiasis in man and animals, it is generally admitted that none of them is entirely satisfactory, although cases of the human disease have undoubtedly recovered after their prolonged use. In experimentally inoculated small animals, such as mice, it is usually possible, by means of a single dose of a drug, to bring about the disappearance of the trypanosomes from the peripheral blood, but almost invariably relapses occur in a comparatively short time and the animals die of the infection.

Haendel and Joetten[1] (1920) and Mayer and Zeiss[2] (1920) published accounts of the trypanosomicidal action of a drug which they referred to as "Bayer 205." They reached the conclusion that the preparation possessed trypanosomicidal powers on various pathogenic trypanosomes in small laboratory animals.

In small doses it cured mice, rats, guinea-pigs and rabbits infected with *T. brucei*, *T. equiperdum*, *T. equinum*, *T. gambiense* and *T. rhodesiense*. The animals which had been cured were for a considerable time immune to further inoculations. A dose of 0.00006 gram (about 0.0024 gram per kilo.) would cure mice of their infections, and the animals were not reinoculable for a period of three months. Administered prophylactically before inoculation the drug prevented infection. The drug was then tried by Pfeiler[3] (1920) in natural dourine in horses. The results in 200 horses thus treated were highly successful, and it is concluded that "Bayer 205" is efficient in the treatment and prophylaxis of dourine, and that it will be found to be equally successful in the treatment of sleeping sickness and other trypanosome diseases. Miessner and Berge[4] (1920) and Ellinger[5] (1920) confirmed Pfeiler's results. In small animals the German workers employed the subcutaneous or intraperitoneal methods of injection.

Dr. C. R. Hennings gave a sample of the drug to Sir David Bruce, who handed it to me for trial. It was tested on a very virulent strain of *T. equiperdum* in mice.

The animals were inoculated intraperitoneally from another heavily infected animal. In forty-eight hours the blood showed very heavy infections, and if left untreated the animals died on this or the following day. In all cases the drug was given forty-eight hours after inoculation by the intravenous route when trypanosomes were swarming in the blood.

It was found that a dose of 0.0025 gram per kilogram of body weight would cause the trypanosomes to disappear, but that relapse occurred in about one week, the animals then dying of very heavy infections two or three days later. A dose of 0.005 gram per kilogram of body weight, however, has not been followed by any relapse during ten weeks' observation. The mice are quite healthy, and from what I know of the action of other trypanosomicidal drugs if relapse is to occur, as is practically always the case, it does so in mice within ten days. It may fairly safely be assumed that the minimal dose required to produce this apparent *sterilisans magna* in mice lies between 0.0025 and 0.005 gram per kilogram of body weight if the drug is administered intravenously.

These doses do not indicate the limit to which one can go. It is possible to give a mouse with a heavy infection as much as 0.5 gram per kilo of body weight. With this high dose there is, however, a definite and immediate reaction, and some of the animals succumb to its toxic effects within twenty-four hours. With half this dose (0.25 gram) the reaction is slight. The German workers pointed out that the ratio of the minimal therapeutic dose required to bring about a permanent cure to the maximal tolerated dose was 1 to 60, and the experiments just detailed bear this

out. Employing the subcutaneous method, their maximal tolerated dose was higher than that obtained here by the intravenous method. The action of the drug is not immediate. The trypanosomes disappear gradually from the blood during the forty-eight hours following the injection. In the case of tartar emetic all trypanosomes may have disappeared in half an hour.

"Bayer 205" thus has a remarkable action on the trypanosomes, in that in every instance (over 50 mice) a single injection of a suitable dose has apparently brought about a *sterilisans magna*, and this in a dose which is considerably lower than that which can be given without killing the animals. There seems every reason to suppose that this drug, whatever may be its constitution—and this has not yet been made public—will be found to be a more efficient remedy than those hitherto used in cases of human and animal trypanosomiasis, if not in other diseases, such as kala-azar. I have tried in animals most of the remedies which have previously been employed for the treatment of trypanosome diseases, and in no case has a permanent cure been obtained with single doses. The animals have invariably relapsed and have died of their infections. Thus, in the case of sodium antimony tartrate it is necessary to give mice intravenously a dose of 0.015 gram per kilo. to cause the trypanosomes to disappear in twenty-four hours, while a dose of 0.05 will kill the animal in less than two days. The toxic dose is thus barely four times as great as the therapeutic dose. If a man of 70 kilograms is to receive the same proportionate dose he should be given $0.015 \times 70 = 1.05$ grams. In practice man is rarely given as much as 0.2 gram as a single dose, and this is often followed by marked reaction. The usual dose for a man is 0.1 gram (10 c.cm. of 1 per cent. solution), which, as will be seen, is about one-tenth of that required by the calculation based on mouse dosage. In the case of neo-salvarsan and its allies 0.02 gram per kilo. of body weight may be taken as the minimal therepautic dose for mice, while a dose of 0.3 gram per kilo. of body weight may be tolerated. A man of 70 kilograms should then have a dose of $0.02 \times 70 = 1.4$, but in practice he is only given about half this amount, as larger doses produce severe reactions. In the case of these drugs, however, the therapeutic dose in mice does not effect a cure, but only brings about a temporary disappearance of trypanosomes. If the minimal therapeutic dose of "Bayer 205" is 0.005 gram per kilo. of body weight for mice the corresponding dose for man would be $0{\cdot}005 \times 70 = 0.35$ gram. If the doses of sodium antimony tartrate and neo-salvarsan which can be tolerated by mice and man bear any relation to the doses of "Bayer 205" which can be given to mice and man, then there is every prospect that human beings will be able to tolerate a dose of 0.35 gram or even more, which is well up to the therapeutic dose required to bring about a permanent cure in animals. The dosage of "Bayer 205" for man, however, has to be determined by direct trial, as calculations based on animal dosage are full of fallacies. It is understood that this is now being done. It is also possible that different samples of the same drug may vary in their action, and the statements made here refer, of course, only to that particular one used by me.

The claims made for this drug by the German investigators, and which have been confirmed by the results detailed above, demonstrate that in experimental animals it has a remarkable trypanosomicidal action. There can be no doubt that the drug should be given a trial on naturally occurring cases of human and animal trypanosomiasis with a view to discovering if it will have in these as definite an action as it apparently has in that produced experimentally in small animals.

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[WENYON, C. M., *The action of "Bayer 205" on Trypanosoma Equiperdum in experimentally infected Mice*. Brit. Med. Jrnl. November 5th, 1921.]

Animal Individuality.

This book is a claim, based on many careful but sympathetic observations, for the possession by animals of reasoning powers, limited in extent, of inter-communication and after existence. The writer contends that since an animal becomes an automaton only after removal of the cortex, and since some display the ordinary human virtues of affection, courage, fidelity and sympathy, it follows that their life is in principle the same as ours, and that they possess each an individual Ego. Domestic animals having no need to struggle for means of subsistence, are necessarily less intelligent than wild ones. The author devotes most of his space to observations on birds, and incidentally makes a strong plea for the preservation of bird life. The book will afford much pleasure to bird lovers, and there are striking thoughts to be found in it, such as: "we seek to teach animals rather than to learn from them, to convey our ideas rather than to deduce any language or code of signals by which they might communicate theirs to us." We wish, however, that the author had approached his subject with a less intensely sympathetic bias. The scientific question at issue, the possession by animals of individuality and reasoning powers, is obscured by the question of immortality and by the plea for kindness and consideration based on this.

F. B.

(The Soul of an Animal: HAWKINS, T. S. G. Allen and Unwin Ltd., pp. 222).

In certain areas a patrol shepherd, under the Ministry of Agriculture, has been appointed to inspect flocks for sheep scab. It has now been decided that the patrol shepherd should be appointed by local authorities, who will be responsible for his maintenance.

Clinical and Case Reports.

The Editor will be glad to receive from members and others contributions to this column of reports of interesting cases.

A Canine Problem.

By ALEX. C. DUNCAN, Cirencester.

The following case presents certain features which appear interesting, and also puzzling.

Subject.—A pure bred Samoyede dog, about eight years old.

History.—The animal was first brought to notice early in July of this year, the complaint being, that his breath was offensive, probably due to decayed teeth.

On examination, the left molars were covered with tartar, and were scaled, during which operation, one tooth showed a small area of caries. This was subsequently extracted without difficulty, and proved to be extensively affected with caries at the roots. The cavity healed without incident.

The dog was in good condition, and showed no particular symptoms of ill health. Although the odour of his breath abated, it did not entirely disappear.

Symptoms.—On October 11th, I was called again to see him; he had been dull for a few days, eating little, and constipated, and the particular reason I was consulted was that he had been vomiting during the preceding day and night.

I found the animal showing symptoms of gastritis, the abdomen tucked up, back slightly arched. A small quantity of ol. ricini had been given.

A further small dose of oil was administered, and a gastric sedative sent, to be given before food, which was restricted to liquids.

This treatment apparently had a good effect at first, for the vomiting ceased, and the bowels acted, and next day the animal appeared distinctly better. But towards evening of this day, he became much worse again, showing sub acute abdominal pain. At this time I had considered the possibility of perforation of the stomach with a sharp bone or other object, especially so as the dog was frequently fed on game bones, and decided to arrange for an X-ray examination in the morning.

Some relief was given by the application of hot cloths to the abdomen during the night, but towards morning the dog died.

Post-mortem.—On the morning of 13th (a few hours after death) a *post-mortem* examination was made, with the following result:—

On opening the abdomen, the urinary bladder was seen much distended. Prostate glands enlarged. Kidneys both cirrhotic. Liver, no macroscopic lesions. Stomach showed intense inflammation, which extended in a lesser degree throughout the intestines. The alimentary canal was empty save for a little milky fluid. The thoracic cavity, on being opened, emitted a most offensive odour. Lungs both gangrenous, and a small amount of pus spread over the surface of the pleura. Pericardium ecchymosed.

Remarks.—The contrast between the *post-mortem* lesions, and the paucity of symptoms exhibited during life are to me at least, striking and bewildering. Some of the conditions must have existed for a considerable time. The chronic interstitial nephritis and enlarged prostates should have revealed themselves by signs. Again, was the offensive breath at any time due to the septic pleuro-pneumonia? If so, it is difficult to understand an animal apparently enjoying good health under such conditions.

I should be glad if any expert in dog practice can enlighten me.

Acriflavine in the treatment of "Thrush."

By H. A. REID, F.R.C.V.S., Wellington, New Zealand.

Subject.—A thoroughbred horse, imported from England.

Symptoms.—Found to have developed thrush in both fore feet. This was attributed to the long journey and bad weather rendering it difficult to maintain the floor of the box in a cleanly condition, the animal standing on wet matting and bedding for the greater part of the voyage. On being exercised, the disease became worse, causing pain, lameness, and hæmorrhage from both fore feet, one being considerably worse than the other.

When I saw him, both fore feet exuded from the cleft of the frogs a thin, foul-smelling discharge, and a small sinus penetrated inwards from the bulbs of the heel.

Treatment.—I had the frog well opened up to facilitate drainage, advised a hot footbath to soften horn and relieve pain, and gave acriflavine, 1 part to 1,000 parts water to inject into the sinus. For this purpose I used the blunt nozzle of a large hypodermic syringe which exactly fitted the opening of the sinus, the injection running out through the cleft of the frog.

Results.—Great improvement had taken place within the next forty-eight hours, and in less than a week, the horse was walking and trotting sound, with no signs of discharge from the feet.

There has been no return of the thrush, and the horse will be put into work when the function of the frog has been sufficiently restored by growth.

I record this successful result in case any of my colleagues may care to try the effect of this drug in similar cases. The acriflavine appears to possess considerable penetrative powers, staining the horn and surrounding tissues a deep orange colour. The injections cause no pain or discomfort to the animal.

B.M.A. Membership.—At the meeting of the Propaganda Sub-committee of the British Medical Association, on October 25th, the Financial Secretary presented figures of membership for the period June 21st to October 6th, 1921. During that period 856 new members joined the Association; 123 members paid arrears of subscriptions; and 15 resignations were withdrawn. Resignations numbered 88, and there were 70 deaths. There was thus a net increase of 836 in the membership of the Association. The total membership on October 6th, 1921, was 23,634, as compared with 22,798 on June 20th, 1921. Such figures speak for themselves.

Association Reports.

The Southern Branch of the National Veterinary Medical Association.

Discussion on "Bovine Abortion and its Control."

(Continued.)

Mr. F. W. Willett said he was very much struck by speakers' remarks as to how the disease was to be eliminated or detected. He thought the only way of getting it under proper control was to make it a notifiable disease. At present his experience was that as soon as a cow aborted the owner sent it off at the earliest possible moment to the market. That was how the disease was spread. The subject was one of the very greatest importance to the community as a whole, and one which should be placed under proper control at the earliest possible moment.

Professor Wood asked Professor Edwards how long a pasture remained infected after the cause of the infection had been removed.

Professor Wooldridge said he thought the main object of the discussion on the subject was really to get the experiences of the clinicians in the field, in which case of course he (Professor Wooldridge) was afraid he could only add very little, but there were one or two points on which he would like some further information. It was suggested that it could be regarded as gross negligence on the part of an agriculturist if he introduced abortion into his herd, presumably because he could have each animal as purchased tested by the agglutination test, and if it reacted it should be rejected. An important point bearing on that was: How long after immunisation of a cow or a heifer did she react to the agglutination test? It might be that she had been immunised, and was thereby immune and still reacted by virtue of the anti-bodies present. If one purchased that cow and tested her and she reacted, was one to reject her? If so, was one rejecting the very animal which should be introduced—an animal that was immune?

Professor Edwards had stated that under no circumstances could a bull infect a cow, even if during service he injected into her living organisms with the semen. That was a statement which might be correct, but at present he thought it would be rather a risky procedure to act upon it. He thought he was correct in saying that in the early days of the investigation of the disease it was not only assumed that the common method of infection at that time was by the introduction of the organism by one means or another *per vaginam*, but that cultures of the organism were also injected into the uterus and into the vagina, and abortion followed. If that were so—and he believed it to be true—it would be certainly a very dangerous thing to assume that the bull, similarly injecting bacilli, would fail to infect a cow. One knew quite well that the common method of infection was by the mouth, and also one knew from experience that it was not an uncommon thing in bacterial affections for immunity to follow without any serious attack of the disease when the organisms were introduced by other channels than the common channel. It was possible that in some of those cases there might be no ill-effects, but possibly some good results. He would not like to risk it, but that fact in itself to which he had just referred would account for the disease not being set up in those cases of early pregnancy where the organisms were introduced under the skin instead of administered by the mouth. One might with safety inject it, but with great risk administer the same dose of the living organism by the mouth.

With regard to cows aborting in successive years, his experience of recent years did not correspond with his experience of former years. In former years certainly the cows that aborted as the result of contagious abortion were very prone to abort again in successive years, but recently that had not been the case. It might be that possibly the organism itself had become somewhat attenuated owing to long residence in cattle, but he considered it more likely to be due to the fact that cows are now often allowed a little longer time after aborting before being bulled again, say two or three months, and are thus able in such cases to clear themselves of abortion bacilli before becoming pregnant again.

In conclusion, he would like to ask: How long did immunity last? Was it a lifelong immunity, or was it an immunity which gradually waned? and, if so, for how long was it effective?

The Reply.

Professor Edwards, in reply, said he must first of all thank the members for the kind consideration they had paid to his paper. It was true that he had spent some time in preparing it, and that the task was one of some difficulty; but the appreciation of the members of the profession at all the meetings he had attended had more than recompensed him for the comparatively small amount of trouble which he had taken in the matter. He did not claim that the paper contained anything which was markedly original. All he had tried to do was justice to the large amount of work which had been done upon the subject by other investigators throughout the world. Anybody who had had the time and the facilities, and who was accustomed to weighing scientific evidence, could have done equally well.

Dealing with the questions *seriatim*, Mr. Samson had asked a very important question, namely, how long did contagion remain on the pasture? Unfortunately there was no very exact information upon that point. It was one of the most important problems in connection with the disease. In the paper he had quoted some of the findings of the Departmental Committee, which found that in the laboratory the contagion could remain alive in the infected material for about six months or so, but that it was not alive after a year. That of course was a very indirect method of ascertaining the longevity of infection, and very likely if the material were voided

on pastures the invasion of the secondary organisms might have something to do with curtailing the virulence of the organism. Some American workers had found a certain milk organism whose growth had a toxic effect upon the abortion organism. Fortunately, he had obtained recently some exact information with regard to the work of that most distinguished American investigator, Schroeder, upon the point. Schroeder covered a placenta from an infected cow, which had been voided directly in the pasture, with some gauze, in order to prevent the attacks of flies, and he found that that placenta, although it had become intensely putrid, was still infective 139 days after it had been voided. One had to admit, then, that infection remained alive on pastures far longer than one anticipated. Laboratory work seemed to indicate the contrary, but from what one could gather it was not safe to regard a pasture as clean until it had been rid of infected cattle for six or seven months at least.

Mr. Samson had mentioned the bull as a possible source of contagion. He would like the members to be clear upon that point. He had never intended to state that the bull should be regarded as entirely innocent. All one could say was that exact investigation had as yet failed to incriminate the bull as a carrier by copulation, and all the clinical instances which had been adduced in support of the bull as a carrier were susceptible of some other interpretation. Exact investigation had failed to incriminate the bull as a carrier. As Schroeder again pointed out, however, the bull should not be regarded as an innocent carrier. He harboured the bacilli in his system for many years after infection, and was even capable of setting up lesions in rare cases in the generative apparatus, and it had also been proved that he was capable of voiding the organisms with the semen. The bacilli would be voided, not only during the act of copulation, but also probably during micturition on the grass. There was no valid reason for supposing that the bacilli thus voided were less virulent than those voided from any other source. In the present state of knowledge, then, one must not exclude the bull entirely when formulating measures for dealing with abortion. All one could say was that the bull was not an important carrier. By far the most important source of infection was the diseased cotyledons of the infected cow, and not only the diseased cotyledons of the cow that had aborted, but also the cotyledons of the cow that had not aborted, or the cotyledons of the cow that had aborted and had subsequently had normal parturitions. He had mentioned in the paper one instance only of such a case, where an American investigator had had a cow which had aborted twice, and which subsequently had had three normal parturitions. In each case the investigator had isolated the bacilli and had taken a culture from the cotyledons. That was to say, that cow, after having aborted twice, was still capable of infecting the pasture with virulent bacilli at three subsequent parturitions.

Mr. Kerry had asked how cows that had aborted should be treated in order to bring them in calf early. The treatment in such cases was not specific, but was the ordinary one which might be adopted in other affections of the womb. If the placenta came away normally, there was no reason for adopting any treatment whatsoever. The pure abortion infection soon disappeared from the womb. Schroeder had found out that it was impossible to establish an abortion infection in the non-pregnant womb. No treatment was needed if the placenta came away normally, but in cases of abortion the placenta was very often retained; and, in fact, veritable outbreaks of retained placenta might occur in herds which were infected with the disease. Such cattle were very prone to infection with secondary organisms. As he had mentioned in the paper, other organisms normally gained access to the womb along that very favourable medium, namely, the retained placenta. First of all certain streptococci got established there which could cause various conditions, ranging from endometritis up to acute metritis, or even pyæmia and septicæmia resulting in death; but there was nothing specific about those complications. They might as well complicate any other form of disease, and the placenta might be retained from other causes. The treatment for such conditions as Mr. Kerry mentioned was simply the ordinary treatment. The Americans recommended largely a flushing of the womb with a weak solution of iodine, but that flushing should be carried out by the veterinary surgeon himself most carefully, and great care should be taken to remove all pieces of retained placenta.

Mr. Hogben had asked him how he would deal with a bull when it was met with in an infected herd. Ought the bull to be vaccinated or should he be regarded as a negligible factor? That was a question which had been asked at other meetings—as to whether the bull should be vaccinated—and the answer, as far as he could see, was decidedly in the negative. The bull should not be vaccinated, because vaccination, namely, infection with doses of living bacilli, had for its object the forestalling of the natural infection resulting in the act of abortion. As the bull, therefore, was not susceptible to that manifestation, namely, the act of abortion, there was no point in vaccinating him. Another question asked was, how long after pregnancy should one apply vaccination? He took it that Mr. Hogben meant, how long after the abortion or parturition should one inject an animal with the vaccine?

Mr. HOGBEN said he wanted to know how long after an animal had first got pregnant was it safe for one to inject vaccine.

Professor EDWARDS said the Ministry of Agriculture did not recommend the injection of pregnant animals at all, and probably he was making rather a rash statement in recommending vaccination of pregnant animals at all, but there was now abundant evidence to show that young pregnant animals especially could be vaccinated with impunity. Corroboration of that statement had been heard that afternoon, and at other meetings also it had been pointed out to him that accidentally a number of practitioners had vaccinated pregnant animals without any ill result. But it should not be lightly undertaken. Certainly animals far advanced in pregnancy should not be

vaccinated, and old animals apparently should not be vaccinated, although Mr. Male that afternoon had pointed out certain instances where animals of quite advanced years had been vaccinated safely after pregnancy. Young pregnant heifers apparently could be vaccinated some time after pregnancy. The reason for that was perhaps not difficult to understand. The vaccine which was at present issued by the Ministry in England and by the Department in Ireland was undoubtedly obtained from an organism isolated many years ago, and had been kept running in laboratories for many years. Quite early in the study of the disease it had been found that the bacillus could be made to vary its virulence quite readily. Moller in America had found that with the bacilli directly isolated from the cotyledons he could produce abortion in rabbits every time, but when the organisms had been cultivated on the surface of media in laboratories for a few generations, then they failed to cause abortion. So that probably the reason why one could now vaccinate pregnant animals, in direct contravention of the recommendations of the Ministry, was that the organisms which the Ministry employed for making the vaccine had become attenuated. The question of Mr. Hogben as to how far in an advanced stage of pregnancy could one inject the animal was a most difficult one. The answer to it depended first on the vaccine and then on the animal. The vaccination should be attempted as early as possible, and in all cases the practitioner should make an endeavour to vaccinate at the time stated by the Ministry, namely, two months before pregnancy.

As to the question of the best method of obtaining blood for tests, he thought ordinary workers had found no great difficulty in obtaining blood, provided their instruments had been good. What was really required was a sharp new needle. The needle which a practitioner sharpened himself was no good. What was wanted was a new needle of a fairly wide calibre. Between each blood-taking it was necessary to flush out the bore of the needle with some solution. If no solution was handy, boiled water should be utilised. When a large number of samples was being taken it would be found that the lumen got coated with some fibrin, and that the same needle could not be employed for more than one or two dozen animals. After that the needle had to be cleaned out by introducing a stilette through its bore and boiling again. The vein was best raised by putting a cord round the neck with a loop at one end, putting the loop over the neck and drawing up the loop, passing the free end through the loop and pulling the loop upwards, so as to get the knot more or less on the vein. That was quite a small technical matter. The important thing was to get a good needle with a fairly wide bore.

(To be continued).

Notes and News

No Cure for Slippery Roads.

IMPROVED SHOEING FOR HORSES.

A report to the Minister of Transport by Sir Henry Maybury, Director-General of Roads, states that an expert committee nominated by the president of the County Surveyors' Society have failed to satisfy themselves that there is any accepted method of road construction or treatment which does not, under certain conditions, leave the road slippery for horses. The committee express the opinion that a large measure of safety for horses on public highways could be obtained by improved shoeing. The committee consisted of Mr. A. Dryland, county surveyor of Surrey (since appointed county engineer and surveyor of Middlesex); Mr. C. F. Gettings, county surveyor of Worcestershire; and Mr. A. J. Lyddon, county surveyor of the North Riding of Yorkshire (since appointed divisional road engineer in the Ministry of Transport).

The committee point out that road surfaces which carry any considerable motor traffic must be waterproof if they are to endure, and so must be occasionally slippery. Stretches of road with an asphaltic or bituminous surface were slippery when damp, and were costly. The shoeing attachment favoured by the committee was an improvement on the flexible bridge pad, which obtained a prize in the open competition held in 1914 by the Roads Improvement Association.—*The Times.*

Professional Status and How to Raise it.

The following is the tersely listed series of conditions requisite for the solution of a problem that evidently confronts more than one profession, presented under the above heading by a well-known contributor to the *Pharmaceutical Journal.*

Raising the status of any profession is the sum of the following accomplishments on the part of its members, collectively and individually:—

(*i.*) Elevating the general standard of education of those entering the profession, and thus bringing more ready brains and keener ambitions into the ranks.

(*ii.*) Increasing the reliability of the rank and file to such a degree that they command the respect of all the professions.

(*iii.*) Increasing theoretical knowledge and practical application.

(*iv.*) Endowing research and increasing facilities for it.

(*v.*) Placing the discoveries of one at the disposal of all.

(*vi.*) Widening the ground over which the profession may exercise its activities and control.

(*vii.*) Adopting disciplinary laws for those who fail in their trust either to their fellow members or the community.

Obituary.

DELEPINE, PROFESSOR SHERIDAN, on November 13th. Director of the Manchester Public Health Laboratory, aged 66.

LAWSON, ALEXANDER, of Manchester. Qualified April 17th, 1872, at Edinburgh. Mr. Lawson died on November 11th, aged 74. He was a member of the Council of the College from 1893-1920, and was for many years chairman of the Finance Committee of the College.

MASON, COLONEL A. W., of Leeds. Qualified July 3rd, 1877, in London. Col. Mason died suddenly at his home on November 13th. He was reading a newspaper, sitting in front of the fire, and expired in his chair. He was a member of the Council of the College from 1891, and also chairman of the Finance Committee.

WHITE.— At the Maternity Hospital, Singapore, October 2nd, 1921, Eileen, beloved wife of Capt. D. P. White (Veterinary Surgeon).

BIRTHS.

WHITE.—At Maternity Hospital, Singapore, on October 2nd, 1921, Eileen, wife of Capt. D. P. White, of a son. (Stillborn).

Correspondence.

Letters to the Editors should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

The Burdizzi Castrator.

Sir,—Would you enquire through the *Record* whether any of my brother practitioners have had experience of the use of the "Burdizzi Bloodless Castrator" as regards lambs. I am particularly anxious to know whether the entire lower portion of the scrotum containing the two testicles may be grasped with the instrument at one time.—Yours faithfully, R. T. DAVIS, Knighton, Radnor.

November 14th, 1921.

Contagious Abortion and its Sequelæ.

Sir,—Since the presentation of a paper by Prof. Edwards on contagious abortion at the meeting of the N.V.M.A. at Chester, a great deal of discussion and interchange of opinions on the above disease have taken place amongst various members of the profession. Not having the privilege of being present at any of those discussions, and having made a special study of the diseases of the generative organs of animals, I hope I may be permitted to make a few remarks on contagious abortion. I have read Professor Edwards' article with very great interest, and if one confines it strictly to a recapitulation of our present-day knowledge of the organism known as Bang's bacillus I consider it one of the most valuable contributions presented to veterinary literature.

I cannot, however, agree with the author that contagious abortion as a whole is a specific disease due to Bang's bacillus. There is no doubt but that it is a contributory factor in its production, but to say that 90 per cent. of abortions are due to this specific organism, and to it alone, is certainly not borne out by the various pathological lesions associated with the disease. On reading the various discussions on Professor Edwards' paper I was particularly struck by the diversity of opinion which seems to exist among the veterinary profession as to the various factors which are responsible for the phenomena of abortion.

The actual premature expulsion of a fœtus is caused by uterine contractions brought about either by a cause acting directly upon the nervous centres, or one which calls out reflex action, or by a combination of the two.

Primary morbid conditions of the fœtus, especially those leading to its death.—If the fœtus dies from any cause its death is followed by degenerative changes in the chorion or placenta, which no longer continues in such active vital connection with the uterine wall. The fœtus then begins to act as a foreign body and sooner or later excites the uterus to expel it. Disease or malnutrition of the fœtus, even without causing its death, may also be associated with similar changes in the membranes and lead in the same way to abortion.

Primary morbid conditions of the amnion, chorion or decidua.—These may either first cause the death of the fœtus or may directly lead to abortion by irritating the uterus. Those morbid conditions which lead to hæmorrhage and consequent separation of chorion or placenta are of special importance. Inflammation and fatty degeneration of the placenta are also frequent causes.

Morbid conditions of uterus.—Inflammation of the cervix, the endometra or metra proper are also frequent causes. Reviewing the actual pathological conditions which are responsible for abortion, we first come to disease and death of the fœtus. Numerous workers have shown these conditions are frequently caused by infections other than those caused by the abortus bacillus. Abortion, where the fœtus has been dead for some time prior to its expulsion from the uterus, is quite common. True, death of the fœtus can be caused by pathological changes in the chorion or placenta, but as the latter are due most commonly to the *B. abortus* infection, these conditions should be looked upon as more or less specific to infection by Bang's bacillus.

Abortion due to malnutrition is a condition which very often exists in the early life of the fœtus. So far as our knowledge up to the present extends, this malnutrition is brought about by the absence of the so-called "uterine milk." Normally in the cow the "uterine milk" is an albuminous fluid lying between the crypts of the maternal uterine mucous membrane and the chorionic villi. The "uterine milk" is secreted by the epithelium which lines the uterine glands. Any inflammation or change sufficient to destroy this epithelium or inhibit its special function also prevents the formation of the "uterine milk," with a consequent malnutrition and perhaps death of the fœtus. We know that the actual uterine changes due to the abortion bacillus are very slight; how then can we reconcile the fact of abortion due to fœtal malnutrition as being due entirely to the *B. abortus*? Morbid conditions of the uterus, such as cervicitis, endometritis and metritis, sufficient to cause expulsion of the fœtus are never produced by *abortus* bacilli infection. It would be better when speaking of contagious abortion as specific for infection by Bang's bacillus to confine ourselves to those conditions where the morbid changes are restricted to the chorion or placenta. As already mentioned, changes of either of the latter may be due to other causes than the actual infection by this specific organism. Normally there is no organ of the body that has a higher power of resistance to infection by pathogenic organisms than the non-gravid or gravid uterus. In the case of infection by Bang's bacillus this high immunity does not seem to exist, especially in the gravid organ, and although the organisms do not exist for any considerable time in the non-gravid uterus, yet they may do so for a sufficient time to break down the immunity it enjoyed to other pathogenic organisms. This latter fact is a phenomenon well known to exist in all cases of immunity; that is, infection by one species of organism may have the power of breaking down an active immunity to another species. I readily admit there are numerous cases of primary abortion due only to the presence of Bang's bacillus, but I also contend that a greater proportion are due to secondary invasion by other micro-organisms, such as streptococci, micrococci, vibrios and types of the colon bacillus, after the natural immunity of the uterus has been destroyed by a primary infection by the *B. abortus*.

In an outbreak of abortion, the agglutination test tells us nothing as to the actual uterine lesions responsible for the expulsion of the fœtus. All we can gather from this test when applied to the B. of Bang is that antibodies specific for this organism are present, but it does not inform us whether the actual bacteria are there or not, and if so what may be the site of their location. For all we know they may have been present in the animal's system some years previous to the actual date of the test. If the same test was applied for other pathogenic organisms the same positive results would probably be obtained in the majority of cases. While in Denmark studying diseases of the generative organs of domestic animals I had abundant opportunities of observing the various conditions responsible for abortion, sterility, etc.

In that country, as in this, disease of the generative organs of breeding animals is looked upon as being responsible for enormous economic losses, but abortion due to Bang's bacillus is considered as a secondary factor in its production. True, it is looked upon as the chief auxiliary of other infections for the reason I have already described. Authorities such as Albrechtsen, Zschokke, Paulsen, and Nielsen pay more attention to infections secondary to that caused by Bang's bacillus than to the actual disease due to this organism. In the human subject, premature expulsion of the fœtus is one of the commonest of the morbid occurrences of pregnancy. On an average every woman who has borne children and reached the limit of child-bearing age has had at least one abortion or premature labour. If this is true for the human species, how much more may it be so for the lower animals where the chances of uterine infection are much greater ?

Let us now consider the rôle to be played by the bull in the dissemination of infection liable to cause abortion. We have sufficient evidence at hand to show that the bull is very seldom responsible for the transmission of infection due to Bang's bacillus. But does this fact hold good for various other pathogenic organisms ? Undoubtedly it does not, and I consider the bull a serious source of disseminating these latter infections. It is this fact which has led to confusion among the various practitioners, some of whom have undoubtedly seen outbreaks of abortion directly traceable to infection from the bull. In an animal whose natural uterine immunity to pathogenic germs has become weakened by the presence of Bang's bacillus, infection by way of the male genital organs is very easy to accomplish.

Regarding vaccination by means of living cultures of Bang's bacillus as a cure or means of control of contagious abortion, I entirely uphold the views expressed on this point by Professor Edwards. Vaccine should only be used as a last resort. So far as my own personal observations go, I believe that contagious abortion is on the increase in this country since the introduction of vaccination. In Ireland this means of treatment has not been used so extensively ; outbreaks of abortion are not so prevalent in that country as in this, certainly there are numerous isolated cases, but few outbreaks on a large scale are met with. One has only to attend the weekly markets of this country and note the number of barren cows offered for sale as compared with Ireland to appreciate the vast difference which exists. As to control of the disease, I again agree with Professor Edwards' advice when dealing solely with infection from Bang's bacillus—isolation and segregation of the diseased animals are the proper courses to adopt.

Now we come to the treatment of the various infections giving rise to contagious abortion. Let me give a brief account of the methods adopted in Denmark whereby the losses due to abortion and sterility have of late years been reduced from 60 per cent. to 10—15 per cent. As already mentioned, abortion due to Bang's bacillus is regarded as a secondary matter in the clinical treatment of contagious abortion as a whole. The uterus of an animal which has aborted contains organisms of one species or another; it must, therefore, be looked upon as containing infection. It must also be regarded as having undergone morbid changes, even though these may be, however, slight. Having the facts in mind, the first thing to do before commencing treatment of any kind is to endeavour to ascertain the nature and extent of these morbid changes. A history of the case will greatly help, especially as to whether there was retention of placenta or not, as the longer the placenta is retained beyond the normal, the greater, often, is the intensity of infection. All cases of abnormal retention of placenta should be looked upon as pathogenic. Examination of the genital organs should be deferred until at least three weeks after date of parturition, whether this be at normal time or not. Then a thorough examination of organs should be made, both *per rectum* and *vaginam*. In nearly all diseased conditions of the uterus this organ is in a condition of subinvolution, such conditions as cervicitis, endometritis and metritis (either singly or in combination) are commonly present. If the infection is of considerable duration there may be also salpingitis and ovaritis. A bacteriological examination of cervical and uterine discharge will often greatly help, especially in prognosis. Having ascertained the lesions present, the next step is to apply proper treatment. In any of the conditions mentioned the method of treatment by vaginal douches, etc., is absolutely useless. It is necessary to get intimately in contact with the lesions present. Whatever treatment may be adopted it must be thorough, and when the parts have become normal, they must be guarded from infection until the animal is mated. By the adoption of methods such as these one will find there will be a great decrease in the number of cases of contagious abortion. In treating a herd, it is not only necessary to make an examination of the animals which have shown clinical signs of disease, such as abortion, etc., but a thorough systematic examination of all the cows on the premises should be carried out at regular intervals, say at least every three months. By this method a number of animals with diseased conditions of the generative organs can be detected before being put to breed, thereby obviating a number of subsequent abortions. These observations equally apply to mares. During treatment strict segregation of the animals should be carried out. Having treated the cow, we should next turn our attention to the bull ; the same rules apply here as in the case of females. It is only by adopting measures the same as or similar to those outlined that the ravages of contagious abortion and its sequelæ can be decreased and brought in check. If farmers and stock breeders could only be made to appreciate the enormous proposition they are up against in the eradication of these diseases from their breeding animals, I am sure they would be much more willing to co-operate and give every assistance to the veterinary profession while endeavouring to combat this scourge.

Yours faithfully, L. C. MAGUIRE,
Barrow Elm House, Fairford, Glos. Capt., R.A.V.C.

Impetuous Zeal v. Lethargy.

Sir,—Your leading article of September 10th on Impetuous Zeal will appeal to the zealous. But what about the lethargic ?

It is true that some few indications have arisen that point to a desire on the part of a few of the profession to seriously consider the reconstruction which is so essential to our welfare, but it would by no means appear that it permeates the profession generally. There are no great indications that this display of zeal has sufficiently impressed Government (except in the case of the R.A.V.C.), and a reorganisation of the service conditions of some of the Colonial Veterinary Departments and proper recognition of veterinary science generally is a necessity.

At the risk of being accused of "impetuous zeal," I again refer to this issue of reconstruction, and re-iterate strongly what I have previously stated. You mention that reconstruction is well under-way and that the time has undoubtedly arrived when judicious application is most urgently demanded. May I ask what reconstruction is under-way in connection with Colonial Veterinary Departments that require reconstruction, or are we to assume that reconstruction has already been effected in the report of the Veterinary Committee on Salaries and Staffing ? If this assumption is a correct one, and if our Council are satisfied that the report of that committee depicts a true and faithful representation of satisfactory conditions of service in the face of the criticisms which have been made on its findings (inside and outside the Council), I can only say that this "newly awakened interest now evident in our body corporate" is a purely local disturbance, which so far has not permeated the Council Chamber to our advantage.

Surely, Sir, if the conditions of Service are such as to call forth a warning from you that applicants for these

appointments would do well to ascertain first what the salary really represents in the Colonies concerned, it should be of sufficient professional importance for our Council to ascertain from men on the spot if such a warning is justified, and, if so, to take some steps to attempt to alter the existing conditions. I admit that impetuous zeal is a dangerous weapon in unscrupulous hands, but its use is permissible against "impenetrable lethargy"—a lethargy which can apparently only be disturbed when conditions arise which personally affect the lethargic ones themselves.

The Council interested themselves in the conditions of service in the R.A.V.C., with good results to the service; a similar interest in Colonial Veterinary Departments would probably have the same effect. No doubt the answer would be that it has its hands full with other and more important work for the good of the profession, but I would point out that the discussion on Colonial Veterinary Departments, if it ever took place seriously in the Council Chamber, was not worthy of the name of discussion from the published reports of meetings; it was never seriously gone into, or more information would have been asked for from men on the spot. The question of R.A.V.C. service was discussed with representatives of that service, and good results followed. Had the same desire been evinced to thoroughly sift the question of Colonial Veterinary Service, there is good reason to suppose that facts would have altered existing conditions, where alteration was obviously indicated.

I apologise for again raising this subject, and I am impetuously zealous enough to affirm that impenetrable lethargy still surrounds the question of Colonial Veterinary Service, as the Colonial Veterinary Service and the profession itself will find to its cost one day.—I remain, yours faithfully, HENRY G. SIMPSON, F.R.C.V.S.

Penang, *October 8th*, 1921.

Stallion Licensing.

Sir,—I wish to reply briefly to the letter in your last issue by Mr. Leslie P. Pugh, headed "A Stallion Licensing Complaint," wherein he refers to valuable stallions having been affected with influenza or strangles, and, as a result, developing roaring.

I am quite with him so far as concerns his assertion that there will be some cases of hardship from having to withdraw the licence from horses in these circumstances, but in formulating the existing scheme, all these things I am quite sure were considered by the several departments concerned, and while there will be isolated cases of hardship, I consider the scheme a grand one, and it will work out with great benefit to the horse breeding industry. Besides, in these cases quoted by Mr. Pugh, where a stallion developes roaring after an attack of influenza, might this not readily come from a hereditary predisposition, and the influenza only act as the exciting cause? Taking everything into consideration, I think the scheme as it stands as near perfect as possible.—Yours faithfully, JOHN KERNOHAN.

Ballymena, *November 10th*, 1921.

Army Veterinary Service.

LONDON GAZETTE—WAR OFFICE—TERRITORIAL FORCES

November 10th.—A. J. McCarmick to be Lieut. (November 11th).

Diseases of Animals Acts, 1894 to 1914. Summary of Returns.

Period.	Rabies. Cases Confirmed: Dogs.	Rabies. Cases Confirmed: Other Animals.	Anthrax. Outbreaks confirmed.	Anthrax. Animals attacked.	Foot-and Mouth Disease. Outbreaks confirmed.	Foot-and Mouth Disease. Animals slaughtered as diseased or exposed to infection.	Glanders (including Farcy).* Outbreaks reported by the Local Authorities.	Glanders (including Farcy).* Animals attacked.	Parasitic Mange. Outbreaks reported by the Local Authorities.	Parasitic Mange. Animals attacked.	Sheep Scab. Outbreaks reported by the Local Authorities.	Swine Fever. Outbreaks confirmed.	Swine Fever. Swine slaughtered as diseased or exposed to infection
GT. BRITAIN.	No.	No	No.	No.	No	No.	No.	No	No.	No.	No.	No.	No.
Week ended 5th November, 1921	..	...	12	16	...	...	...	...	19	24	4	24	13
Corresponding Week in 1920	1	..	8	8	1	131	1	1	17	30	12	26	8
Corresponding Week in 1919	...	...	7	8	7	288	...	3	32	63	5	55	17
Corresponding Week in 1918	2	..	5	6	..	..	1	8	46	76	4	27	33
Total for 45 weeks, 1921 ...	22	1	431	551	43	2958	11	41	1872	2849	448	1084	407
Corresponding period in 1920	30	...	363	434	78	10115	13	22	3281	5404	356	1636	665
Corresponding period in 1919	146	5	192	250	66	2688	22	58	4362	8658	273*	2018	938
Corresponding period in 1918	57	2	211	243	3	40	20	85	3789	7090	274	1231	510

NOTE. The figures for the current year are approximate only. *Excluding outbreaks in Army horses.

IRELAND. Week ended 5th November, 1921	...	...	...	...	...	...	Outbreaks ...	7	2	4
Corresponding Week in 1920 ...	...	...	...	...	..	...	..	5	...	...
Corresponding Week in 1919 ...	...	...	...	...	..	...	2	7	...	...
Corresponding Week in 1918 ...	...	...	...	...	..	..	.	8	...	...
Total for 45 weeks, 1921	1	1	7	77	...	...	71	236	102	58
Corresponding period in 1920 ...	1	1	...	...	1	3	90	289	12	34
Corresponding period in 1919 ...	...	...	...	...	1	1	134	231	30	93
Corresponding period in 1918 ...	2	2		...	...	...	93	270	25	85

NOTE.—The figures for the current year are approximate only.

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SOME RECENT CLAIMS PAID.

Owner.	Address.	Date Completed.	Date Paid.	Amount. £	s.	d.
W.J.,	Clynnog	5 Aug.	5 Aug.	20	0	0
F.W.E.,	Cinderford	5 Aug.	9 Aug.	29	12	6
J.N.,	Augher	29 Aug.	1 Sep.	50	0	0
R.N.,	Dundee	19 Sep.	19 Sep.	78	0	0
J.A.,	Alconbury	17 Oct.	19 Oct.	48	5	0
T.F.B.,	Cork	17 Oct.	17 Oct.	18	5	0
R.R.,	Lampeter	7 Oct.	11 Oct.	40	0	0
J.H.M.,	Cork	24 Oct.	24 Oct.	15	9	0
J.S.,	Clovelly	25 Oct.	25 Oct.	12	0	0
M.L.,	Aughnacloy	25 Oct.	27 Oct.	25	0	0
W.P.,	Pentreelyn	29 Oct.	29 Oct.	18	0	0

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